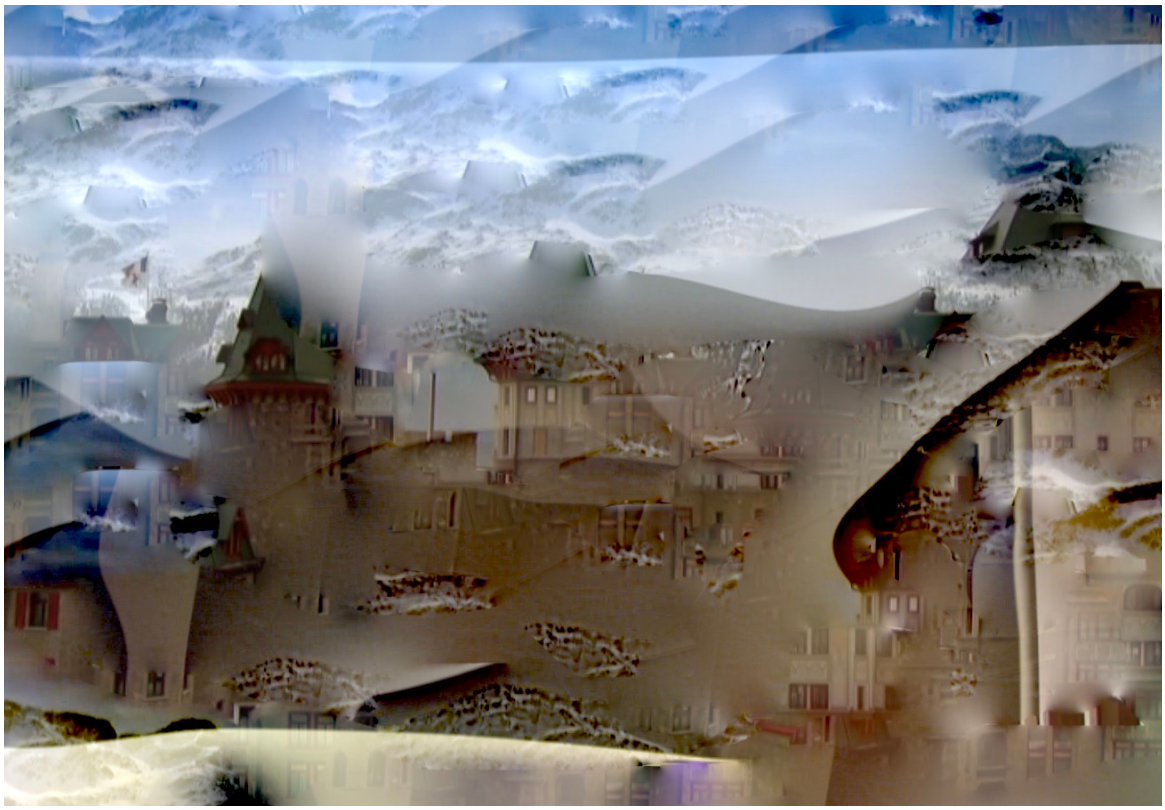

ACHIM SZEPANSKI 2024-08-17

DELEUZE/GUATTARI AND QUANTUM THEORY

GENERICSCIENCE CHAOS, DELEUZE/GUATTARI, QUANTUM THEORY

Now a word on Deleuze/Guattari and their relationship to quantum theory, although both authors make fewer explicit statements on quantum theory than Baudrillard or Laruelle. One could start with their concept of chaos. With its mathematical structure, the classical theory of chaos, which is described as “deterministic”, leads to the system figuratively “sitting like a grain of sand on a knife edge” at a bifurcation point – and such a state with an exact location – precisely at the bifurcation point – and an exact speed of zero according to Heisenberg’s indeterminacy relation never exists in nature. So if classical physics with its mathematics predicts something that cannot exist, quantum theory must intervene to correct it.

Deleuze/Guattari define chaos less by its disorder than by the infinite speed with which every form and movement in chaos takes shape and disappears again. “It is a void that is not nothing, but a virtual that contains all possible particles and produces all possible forms that only appear to disappear again immediately, without consistency or reference, without consequence. Chaos is an infinite speed of emergence and disappearance. (Deleuze/Guattari 1994: 250) This refers to the virtuality of thought in art, philosophy and science, but it can also be related to quantum field theory, to the concept of the virtual creation and annihilation of particles from the vacuum, a sea of energy, an image that can be linked to Deleuze/Guattari’s image of chaos. The virtual is a form of the real that ultimately always eludes thought and thus never becomes real: It is real without being real. Consistency and openness in creation and annihilation are never to be understood here as absolute concepts. In the world there is no absolute consistency in the sense of pure order, just as there is no absolute indeterminacy or openness in the sense of pure randomness or noise. These extremes are the phantoms of Platonism, stoking the fear of entropy and disordered chaos to justify hard alignments.

However, chaos in Deleuze/Guattari and in quantum field theory also differ. In the latter, the speed of all processes in question is finite and limited by the speed of light in a vacuum. Deleuze/Guattari’s appeal to infinite speed refers first of all to the speed of thought and can be linked to Feynman diagrams, which, according to Deleuze/Guattari, represent the actual processes of virtual creation and annihilation of particles in quantum field theory to a certain extent. At each point of the processes represented by a particular Feynman diagram, another virtual process can occur and thus another diagram can be inserted, leading to an infinitely extensible topological structure. Feynman diagrams are diagrams that help us to visualize a situation at least heuristically, or, to put it differently, to slow down the phenomenological chaos of the situation in order to keep representations in memory and support computations. What actually happens at the real level of such processes is equally impossible for us to know, let alone visualize.
(Quantum field theory entails higher epistemological and conceptual complexities than quantum mechanics or even classical physics. However, in string theories it can lead back to a more classical and conceptual view, for example to a more classical and above all more vivid picture of an underlying order).

Quantum field theory makes it possible to combine the concept of the virtual in chaos with the idea of chaos as the unthinkable. This connection arises from the possibility that the processes responsible for the creation or destruction of forms, for their emergence and disappearance, or for the speed of both, are ultimately unrepresentable with the means at our disposal. At this point, Deleuze and Guattaris refer to black holes, the ultimate nature of which eludes our understanding.

Another concept of chaos, namely that of disorder, which is determined by the role of chance in its workings, must also be considered here. Deleuze/Guattari do not completely deny the concept of chaos as disorder. While chaos may not be defined so much by its disorder (as by infinite speed), it may be defined at least in part by chance. Since all our knowledge of nature can only be formulated statistically, chaos comes into the picture as chance and disorder. The

character of chance in quantum physics is irreducible in terms of an underlying or hidden necessity of the ultimately unknowable and even unimaginable nature of quantum objects and processes as seen or idealized by quantum theory. There is no principled knowledge that would allow us today or ever to eliminate chance and replace it with the image of necessity that underlies it. But neither can we postulate a causal dynamic as unknown or even unknowable that exists in and of itself outside of our engagement with it. This restriction is crucial, since some forms of the classical understanding of chance allow for this kind of (realist) assumption. (Plotnitsky 2006b)

Moreover, the fact that in both quantum mechanics and quantum field theory, at least in the concept of complementarity, the "ultimate" objects and processes cannot be recognized, let alone visualized, implies the essential existence of chaos as the unthinkable. Chaos as the unthinkable and chaos as chance or disorder are part of the new concepts of quantum theory or part of the chaosmos, to use a formulation by James Joyce or Deleuze/Guattari. In quantum field theory, these two concepts of chaos are favored because they are the only way to deal with chaos and to build the physical and mathematical architecture of quantum field theory. To accomplish this task, however, quantum field theory is forced to continue to deal with chaos as the virtual (virtual particles and voids), combining the image of chaos as the unthinkable and chaos as chance. Quantum field theory takes the concepts of chaos as the unthinkable and chaos as chance and disorder from quantum mechanics, but adds the concept of chaos as the virtual. The concept of virtual particle formations and thus the role of the chaos of the virtual thus remains important for quantum field theory. Accordingly, the self-consistent generalizations about chaos as chance and chaos as the unthinkable, and in the case of quantum field theory about chaos as the virtual, constitute what quantum theory tells us in an approximation about nature. In other words, chaos as the virtual belongs to the scientific thinking of quantum field theory, while chaos as the incomprehensible and chaos as chance also belong to nature in the (chaotic) order of quantum mechanics..

Plotnitsky cites quantum electrodynamics within quantum field theory. An electron and a positron (anti-electron), a photon, an electron-positron pair can be found in the field, whereby only probabilities for movements can be correctly predicted by quantum field theory, which makes chance and chaos as chance unavoidable. The result is that in quantum field theory, the study of a particular type of quantum object (e.g. electrons) involves not only other particles of the same type, but also other types of particles, possibly all existing types of particles. It is as if instead of an identifiable, moving object, as studied in classical physics, there is a constant appearance and disappearance, creation and annihilation of particles from point to point, so-called virtual particle formation. Although such events are possible in principle and their possibility defines the situation and what can and cannot actually happen, only some of them can be registered. Usually, those particles that are registered by observations are called "real particles", while those that are not registered are considered "virtual particles". The corresponding quantum field theoretical physical concept has a mathematical and experimental rigor specific to science, but retains the central philosophical conceptual architecture of the virtual. (Plotnitsky)

A further starting point at which Deleuze/Guattari dock onto quantum theory is the term of

the plane of immanence. It is pre-philosophical insofar as Deleuze/Guattari consider it relatively separately from the concepts. Concepts can be understood as several waves that rise and fall, but the plane of immanence is the only wave that rolls concepts up and down. Thus, in this concept, philosophical thinking is illustrated as a particularly structured wave process. Non-philosophy is located where the plane of immanence confronts chaos. Philosophy needs a non-philosophy that understands it; it needs a non-philosophical understanding, just as art needs non-art and science needs non-science. The plane of immanence, which, according to Deleuze/Guattari, was invented by Spinoza, is that which must be thought and that which cannot be thought. It is the non-thinking in thinking. This opens up an analogy to the level of quantum mechanical thinking, whereby the latter here has to be philosophical rather than physical. The ultimate nature of quantum objects such as electrons and photons must be thought and yet cannot be thought through quantum theory.

The plane of immanence is also responsible for the non-localizable interferences that are referred to as bringing in what must be thought and yet cannot be thought. To this we might add that Heisenberg's and Bohr's thinkable quantum objects are non-localizable interferences that are themselves quantum-like. But we cannot describe or even comprehend the ultimate nature of quantum objects, even though we have to work with these unimaginable objects that must be thought and cannot be thought. One could also add the undecidability of certain mathematical propositions in mathematics, i.e. propositions that cannot be proven true or false using a system of axioms in which they are formulated (although some of them can be considered true). Gödel was the first to prove the existence of such theorems in most functioning mathematical systems. He also proved that the statement that such a system is consistent is also undecidable, so the consistency of most mathematical systems cannot be guaranteed. Gödel's undecidability could have influenced Deleuze/Guattari's thoughts on the unconscious. The idea of undecidability arises through an interference between philosophy and mathematics. Mathematics with its immanent axioms does not represent objects, but formalizes and symbolizes connectivity in the medium of truth in the sense of Luhmann.

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